

(19) **United States**

(12) **Patent Application Publication**  
Ciesla et al.

(10) **Pub. No.: US 2012/0098789 A1**

(43) **Pub. Date: Apr. 26, 2012**

(54) **USER INTERFACE SYSTEM**

(52) **U.S. Cl. .... 345/174; 340/407.2**

(76) Inventors: **Craig Michael Ciesla**, Mountain View, CA (US); **Micah B. Yairi**, Daly City, CA (US); **Nathaniel Mark Saal**, Palo Alto, CA (US)

(21) Appl. No.: **13/278,125**

(22) Filed: **Oct. 20, 2011**

**Related U.S. Application Data**

(60) Provisional application No. 61/405,140, filed on Oct. 20, 2010.

**Publication Classification**

(51) **Int. Cl.**  
**G06F 3/045** (2006.01)  
**G08B 6/00** (2006.01)

(57) **ABSTRACT**

One embodiment of the user interface system comprises: a volume of fluid; a tactile layer; a retaining wall substantially impermeable to the fluid; a permeable layer; a displacement device; and a touch sensor. The tactile layer, with a back surface, defines a second region, operable between: a retracted state, wherein the second region is substantially flush with a first region; and an expanded state, wherein the second region is substantially proud of the first region. The permeable layer, joined to the back surface of the first region, includes a plurality of fluid ports that communicate a portion of the fluid through the permeable layer to the back surface of the second region. The displacement device directs the fluid through the fluid ports to the back surface to transition the second region from the retracted state to the expanded state. The touch sensor detects a user touch on the tactile layer.

